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CLAIMS

[Claim(s)]

[Claim 1]A way characterized by comprising the following a pillar of both sides is set up on the established foundation which became independent, respectively, and the upper part transfers large-sized torii of a double housing type connected by horizontal bracing.

A basic construction process which connects said established foundation of both sides and builds a massive foundation.

Said massive foundation which built a protection engine frame surrounding said large-sized torii, and an engine-frame construction process assembled in one.

A conveying step which raises said protection engine frame by a rise-and-fall transportation means with said large-sized torii and said massive foundation and to which it is made to move.

[Claim 2]In a moving method of the large-sized torii according to claim 1, said established foundation of both sides, A moving method of large-sized torii, wherein it is connected with steel materials for stress, and is joined with concrete, two or more bearing brackets which project horizontally substantially are provided in the circumference of said massive foundation and said protection engine frame is set up on said two or more bearing brackets.

[Claim 3]A moving method of the large-sized torii according to claim 1 or 2 characterized by comprising the following.

Two or more foldable supporting frames with which said rise-and-fall transportation means was provided in both sides of said large-sized torii.

A rail constructed on this supporting frame of plurality of both sides, respectively.

It is provided on said rail of both sides, this rail is met, and it is a movable cart with a rising and falling mechanism.

A pendant beam which is constructed over said rising and falling mechanism of both sides, and is connected to said protection engine frame.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the moving method of the large-sized torii made to transfer while large-sized torii had been made to set up, when performing the temporary move and move of large-sized torii accompanying repair of a shrine etc.

[0002]

[Description of the Prior Art]As for the stone-made large-sized torii currently built by the shrine, most is built by the early stages of Showa. In recent years, although the city comprehensive development enterprise was undertaken in various places, large-sized torii might become development work and an obstacle of member conveyance. Stone-made large-sized torii is the heavy lift built with the stone (50t-100t) on the foundation (50t-100t) which became independent on both sides, respectively, for example, and junction of each member was performed by the wedge in many cases. In development construction, large-sized torii needed to be disassembled and moved by the special craftsman, and it needed to restore to the original position after the end of construction.

[0003]

[Problem(s) to be Solved by the Invention]Since the moving method of said conventional large-sized torii had erection of large-sized torii, and the insufficient tradition of the skill of restoration, the craftsman who can restore as before had stopped however, being almost in it. Therefore, where large-sized torii is set up, had to transfer, but. Since the steel rod was not used for it, the foundation was weak against it, and since the foundation which supports the pillar of the both sides of large-sized torii was independently built by the conventional foundation, respectively, it was difficult to transfer without changing the position of the foundation of both sides to it. This invention was made in view of this situation, and an object of this invention is to provide the moving method of the large-sized torii which it can transfer where large-sized torii is set up, and raises the intensity of the foundation after restoration.

[0004]

[Means for Solving the Problem]A moving method of large-sized torii concerning this invention in alignment with said purpose is provided with the following.

A basic construction process which a pillar of both sides is set up on the established foundation which became independent, respectively, and the upper part is how to transfer large-sized torii of a double housing type connected by horizontal bracing, connects said established foundation of both sides, and builds a massive foundation.

Said massive foundation which built a protection engine frame surrounding said large-sized torii, and an engine-frame construction process assembled in one.

A conveying step which raises said protection engine frame by a rise-and-fall transportation means with said large-sized torii and said massive foundation and to which it is made to move.

Wooden things besides a stone-made thing are contained in large-sized torii, for example. As for a massive foundation, it is preferred to say a thing also included the established foundation, and to set and build a level of the established foundation and the upper part. By this composition, it can lay underground in the earth as it is with the established foundation after restoration, and execution time can be shortened, and basic intensity can be raised.

[0005] Since rocking at the time of movement of large-sized torii can be prevented since a protection engine frame is assembled and this protection engine frame is raised, and power raised upwards is not directly added to large-sized torii, damage to large-sized torii can be prevented. It is also possible to connect said established foundation of both sides with steel materials for stress, and to join it with concrete here, to provide two or more bearing brackets which project horizontally substantially around said massive foundation, and to set up said protection engine frame on said two or more bearing brackets. The steel materials for stress refer to steel materials which are used for concrete (henceforth PC) which was able to add prestress, and give tension to an inside of concrete, Steel bars for prestressed concrete which used and made carbon steel, low alloy steel, spring steel, etc. besides a PC wire which performed cold work and bluing to piano wire rods, and hard drawn steel wires for prestressed concrete cold-worked to high carbon steel wire rods to 1 or two or more methods among stretching, a cold drawing, and heat treatment are also contained. What processed it by ***** to these steel materials is contained. Since the established foundation of both sides is connected with steel materials for stress, the established foundation of both sides is certainly fixed, it can be made to be able to unify and intensity of the established foundation can be raised.

[0006] Two or more foldable supporting frames formed in said rise-and-fall transportation means at both sides of said large-sized torii, It is also possible for it to be provided on a rail constructed on this supporting frame of plurality of both sides, respectively and said rail of both sides, and to provide a movable cart with a rising and falling mechanism and a pendant beam which is constructed over said rising and falling mechanism of both sides, and is connected to said protection engine frame along with this rail. Both sides of large-sized torii mean arbitrary horizontal both sides besides a longitudinal direction or a cross direction. A cart which attached to the upper part a hydraulic lifter provided with a rod which can project up, for example can be used for a cart with a rising and falling mechanism. Although the number of pendant beams is arbitrary, in order to control rocking of large-sized torii, it is preferred to use two or more. By this composition, since supporting frame is foldable, conveyance of a member and construction of a rise-and-fall transportation means can be performed easily. Since large-sized torii is supported from both sides, inclination is suppressed, it can be stabilized and large-sized torii can be moved.

[0007]

[Embodiment of the Invention] Then, referring to the attached drawing, the embodiment which materialized this invention is described and an understanding of this invention is presented. In drawing 1 - drawing 4, the direction of X explains the right of the large-sized torii 11, and the direction of Y explains the front of large-sized torii, and a Z direction as the upper part. As shown in drawing 1, the moving method of the large-sized torii concerning this invention, For example, it is set up, respectively on the established foundation 13 which the pillars 12 and 12a of both sides became independent of, and 13a, It is the method of transferring the stone-made large-sized torii 11 of a double housing type in which the upper part is connected using the rise-and-fall transportation means 10 with a set-up state by the copings 16 and 17, **** 18 and 19, and ** 20 which constitute a horizontal bracing. First, with reference to drawing 1, the assembly state of the large-sized torii 11 is explained. Height is 5-15m, and a path has the truncated cone shape which becomes small little by little toward the upper part, and the pillars 12 and 12a of the large-sized torii 11 are leaned for a while in the direction which approaches via the turtle stone 15 on the established foundation 13, respectively, and are set up. The copings 16 and 17 and **** 18 and 19 which connect the upper part of the large-sized torii 11 make each end which counters contact, and on **** 18 and 19, after

the copings 16 and 17 have appeared, they are polymerized and provided at the crowning of the pillars 12 and 12a.

[0008]The copings 16 and 17 and **** 18 and 19 are symmetrically formed centering on the middle position of the pillars 12 and 12a, and from the pillars 12 and 12a, each outside end is in an outside position, respectively, it is leaned for a while up and formed. When the copings 16 and 17 are contacted in the center section, total length is 10–15m. The lower end of the contact part of **** 18 and 19 is supported by **** 21 of rectangular plate shape, and the lower end of **** 21 is supported by the top center of ** 20 laid across by the pillars 12 and 12a of both sides. The both ends of ** 20 are inserted in the side in which the pillars 12 and 12a counter, respectively, and are being fixed by the wedge member which is not illustrated. The extended member 22 which has ** 20 and an isomorphous section is formed in the both-outside part of each pillar 12 and 12a on extension of the axial center of ** 20.

[0009]Since the copings 16 and 17 and **** 18 and 19 are supported by **** 21 in the mid-position of the pillars 12 and 12a, respectively, if the large-sized torii 11 inclines, it falls out and they may be damaged. Therefore, in order to transfer without disassembling the large-sized torii 11, it is necessary to make it move with a set-up state. Here, the established foundation 13 and 13a which supports the pillars 12 and 12a of the large-sized torii 11 is explained. The established foundation 13 and 13a is independently established with prismatic concrete, respectively. As for the size of each established foundation 13 and 13a, 3–5m, and the depth are 1–3m in 2–4m, and Y shaft orientations at the X axial direction, for example. Since the established foundation 13 and 13a is established independently, respectively, if each relative position changes, bending stress may be added and damaged in the stone-made large-sized torii 11. Since the established foundation 13 and the large-sized torii 11 set up on 13a have the portion which holds the shape by polymerizing and laying each member, a gap of a joint position may produce it by vibration at the time of movement. In order to prevent these, the moving method of the large-sized torii concerning this embodiment has the following processes.

[0010](Basic construction process) A basic construction process is a process of connecting the established foundation 13 and 13a of both sides, and building the massive foundation 23. First, as shown in drawing 1 and drawing 2, plane view is carried out between the established foundation 13 and 13a of both sides, and the rectangular basic connection hole 24 is excavated and formed. Subsequently, concrete is slushed into the basic connection hole 24, it is solidified, the established foundation 13 and 13a is connected, and the massive foundation 23 is built. Hereafter, it explains to the massive foundation 23 as a thing also including the established foundation 13 and 13a. Next, the operating hole 26 which surrounds the massive foundation 23 is excavated and formed. As for the depth of the operating hole 26, at this time, it is preferred to form somewhat more shallowly than the depth of the established foundation 13 and 13a somewhat more deeply than the basic connection hole 24. The established foundation 13 and 13a can be connected, holding the supporting strength of the large-sized torii 11 on the established foundation 13 and 13a by this composition, and resistance when raising from the foundation can be made small.

[0011]Subsequently, it forms in the massive foundation 23 by the boring work using the core tube which does not illustrate two or more level holes which carry out plane view and intersect perpendicularly substantially. And the PC bolt 39 using the PC wire which is an example of the steel materials for stress is inserted in each formed level hole, the nut 40 is concluded to the flank of the massive foundation 23, and both ends are fixed to it. By this composition, to the massive foundation 23, compressive force can be given horizontally and the proof stress over the shearing load and bending stress of the massive foundation 23 can be increased. It becomes possible to prevent stress concentration from being added to the large-sized torii 11 without being formed in one and changing the relative position of the pillars 12 and 12a of the both sides of the large-sized torii 11, since especially the established foundation 13 and 13a of both sides is connected with the PC bolt 39 and it is joined with concrete. Next, the position which avoided the fitting location of each PC

bolt 39 around the massive foundation 23 is made to project every prescribed interval horizontally substantially, and the bearing bracket 25 is formed in it. The base of the bearing bracket 25 can use a chemical anchor for the circumference of the massive foundation 23, for example, and can be fixed to it. The compression stress to the massive foundation 23 with the PC bolt 39 can be made uniform by attaching a steel plate to the circumference of the massive foundation 23, and attaching the PC bolt 39 and the bearing bracket 25 via a steel plate, and the mounting strength of the bearing bracket 25 can be raised.

[0012](Engine-frame construction process) As shown in drawing 2 - drawing 4, the protection engine frame 27 surrounding the large-sized torii 11 is set up on two or more bearing brackets 25, and is assembled in one with the built massive foundation 23. The lower part of the protection engine frame 27 is connected to the bearing bracket 25 projected and provided in the circumference of the massive foundation 23, and each bearing bracket 25 is connected by the reinforcing member 27a of the frame shape surrounding the massive foundation 23. Thereby, the connection to the massive foundation 23 and the protection engine frame 27 is strengthened. The position of the cross direction of the upper part of the protection engine frame 27 approaches the large-sized torii 11, and is established. As shown in drawing 4, it hangs in the lower part of the protection engine frame 27, and a total of the four supporters 28 is provided. Each hanging supporter 28 can be projected to the cross direction of the established foundation 13 and 13a, respectively, since it is separated from it of the distance between front-and-back-ends parts, when hanging and conveying the large-sized torii 11, is stabilized, can be supported, and it can lessen rocking to the cross direction of the large-sized torii 11. It is preferred to pinch buffer members, such as dunnage which is not illustrated, between the protection engine frame 27 and the large-sized torii 11. By this composition, the vibration at the time of transportation is absorbable, and contact with the protection engine frame 27 and the large-sized torii 11 by rocking can be prevented. As for the wedge member which is fixing the pillars 12 and 12a and ** 20 of the large-sized torii 11, removing is preferred. It is to prevent the large-sized torii 11 from stress being added to a joining section at the time of movement, and being damaged.

[0013](Conveying step) In a conveying step, the rise-and-fall transportation means 10 is built first. Construction of the rise-and-fall transportation means 10 may be begun before a basic construction process, after a basic construction process is completed, it may begin, but it is preferred that the end of an engine-frame construction process and construction of the rise-and-fall transportation means 10 are completed at the same stage. By doing in this way, each work can be done continuously and a construction period can be shortened. As shown in drawing 1 - drawing 5, the rise-and-fall transportation means 10 is provided with the following.

Two or more foldable supporting frames 29 formed on the pedestal 30 which is installed in the both sides of the large-sized torii 11, and is prolonged forward and backward.

The rail 32 constructed two [at a time] via the spacing member 31, respectively on the supporting frame 29 of the plurality of both sides.

The cart 34 with oil hydraulic cylinder 33 which it is provided on the rail 32 of both sides, and is an example of a movable rising and falling mechanism along with the rail 32.

The pendant beam 35 which is constructed over the oil hydraulic cylinder 33 of both sides, and is connected to the protection engine frame 27.

[0014]Since the supporting frame 29 is foldable temporary frame marketed, it can perform conveyance to a fitting location easily. Although the thing of solid frame shape is being used for the spacing member 31, it is also possible to use a plate and a bar depending on the height of the large-sized torii 11. The oil hydraulic cylinder 33 provided in the cart 34 is stroking greatly by raising, for example using the thing of a telescope type box. By this composition, even when the depth of the established foundation 13 and 13a is deep, sufficient margin can be had and raised. As for the oil hydraulic cylinder 33, a total of four sets are used two sets at a time forward and backward, and the

pendant beam 35 is attached to the oil hydraulic cylinder 33 used as the pair of the direction both sides of X two [at a time] a total of four. On the pendant beam 35, it can attach to the hanging supporter 28 with which the two hanging support means 36 which have the wire rope which attached the fixing metal 41 to the tip part were established at a time, and were provided in the protection engine frame 27 four places, respectively, and the large-sized torii 11 can be supported. By this composition, since it can support two places at a time the large-sized torii 11 order, respectively, rocking to the direction of X and the direction of Y of [at the time of conveyance] can be lessened, and breakage of the large-sized torii 11 can be prevented.

[0015]When conveying the large-sized torii 11, as shown in drawing 3 - drawing 5, move the cart 34 to the upper front and back position of the large-sized torii 11, and it arranges the pendant beam 35 two [at a time], The fixing metal 41 of the hanging support means 36 attached to the pendant beam 35 is fixed to the corresponding hanging supporter 28 of the protection engine frame 27, respectively. Next, if the cylinder rod of the oil hydraulic cylinder 33 is expanded as shown in drawing 2 and drawing 3, upward power will be added to the protection engine frame 27 via the pendant beam 35 and the hanging support means 36. Since the protection engine frame 27 is connected with the bearing bracket 25 of the massive foundation 23, the massive foundation 23 and the large-sized torii 11 are separated from the foundation, and go up. The weight of the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 is 150-250t, 50-100t and 50-150t, respectively. The level of the center of gravity of the massive foundation 23 and the large-sized torii 11 which were hung, and the protection engine frame 27, Since it is in a downward position from the lower end level of the large-sized torii 11, by supporting the hanging supporter 28 which is in an upper position from the lower end level of the large-sized torii 11, it stops, and it can be stabilized and the inclination and rocking at the time of hanging can be raised.

[0016]Where the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 are raised, the cart 34 can be moved back. As shown in drawing 2 and drawing 4, behind the installed position of the large-sized torii 11, the heavy-lift carrying truck 37 connected two sets is standing by. The cart 34 and the oil hydraulic cylinder 33 can be operated, and the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 can be loaded via the mounting base 38 on the heavy-lift carrying truck 37. And the heavy-lift carrying truck 37 can be driven and the large-sized torii 11 can be moved further far away. Two or more sets interlock and advance of this heavy-lift carrying truck 37 is attained to arbitrary horizontal directions. After the large-sized torii 11 moves, blinding members, such as a temporary board which does not illustrate the operating hole 26, can close, and other work can be done in a shrine. It is possible to also remove this, when the rise-and-fall transportation means 10 becomes an obstacle.

[0017]In restoring the large-sized torii 11 to the original position, After assembling the rise-and-fall transportation means 10 again and removing a blinding member, the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 are moved with the heavy-lift carrying truck 37, and it hangs again to the hanging support means 36 of the rise-and-fall transportation means 10, and the massive foundation 23 is inserted in the operating hole 26, and is installed. And the large-sized torii 11 can be restored by removing the protection engine frame 27. Although the large-sized torii 11 was supported on the independent established basis 13 and 13a before the move, since this is connected, the massive foundation 23 is built and compression stress is further applied horizontally with the PC bolt 39 and the nut 40, it is stabilized and the large-sized torii 11 can be held certainly for a long period of time. Thus, basic reinforcement can also be performed with transfer work by using the moving method of the large-sized torii concerning this embodiment. As mentioned above, although the embodiment concerning this invention has been described, this invention is not limited to said embodiment, and although the large-sized torii 11 concerning said embodiment has **** 21 and the extended member 22, naturally it is applicable [torii] also to the large-sized torii which omitted this, for example. A structure with an unstable double housing type which has the same shape as large-sized torii is also included in large-sized torii. Also when

carrying simultaneously two structures set up on both sides, without changing each relative position, naturally it can apply.

[0018]

[Effect of the Invention]In the moving method of the large-sized torii according to claim 1 to 3, without adding an unbalanced load to the large-sized torii set up on the foundation, since it has a basic construction process which connects the established foundation of both sides and builds a massive foundation, it is stabilized, and can support and move. Since rocking at the time of movement of large-sized torii can be prevented since a protection engine frame is assembled and this protection engine frame is raised, and the power raised upwards is not directly added to large-sized torii, damage to large-sized torii can be prevented. Especially in the moving method of the large-sized torii according to claim 2, since the established foundation of both sides is connected with the steel materials for stress, the established foundation of both sides is certainly fixed, it can be made to be able to unify, the intensity of the established foundation can be raised, and the intensity of the foundation after restoration can also improve further. Since two or more bearing brackets are provided in the circumference of a massive foundation and a protection engine frame is set up on a bearing bracket, a massive foundation is certainly separable from the foundation by connecting a protection engine frame with a massive foundation certainly, and raising a protection engine frame. And in the moving method of the large-sized torii according to claim 3, since supporting frame is foldable, conveyance of a member and construction of a rise-and-fall transportation means can be performed easily. Since large-sized torii is supported from both sides, inclination is suppressed, it can be stabilized and large-sized torii can be moved.

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TECHNICAL FIELD

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PRIOR ART

[Description of the Prior Art]As for the stone-made large-sized torii currently built by the shrine, most is built by the early stages of Showa. In recent years, although the city comprehensive development enterprise was undertaken in various places, large-sized torii might become development work and an obstacle of member conveyance. Stone-made large-sized torii is the heavy lift built with the stone (50t-100t) on the foundation (50t-100t) which became independent on both sides, respectively, for example, and junction of each member was performed by the wedge in many cases. In development construction, large-sized torii needed to be disassembled and moved by the special craftsman, and it needed to restore to the original position after the end of construction.

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EFFECT OF THE INVENTION

[Effect of the Invention]In the moving method of the large-sized torii according to claim 1 to 3, without adding an unbalanced load to the large-sized torii set up on the foundation, since it has a basic construction process which connects the established foundation of both sides and builds a massive foundation, it is stabilized, and can support and move. Since rocking at the time of movement of large-sized torii can be prevented since a protection engine frame is assembled and this protection engine frame is raised, and the power raised upwards is not directly added to large-sized torii, damage to large-sized torii can be prevented. Especially in the moving method of the large-sized torii according to claim 2, since the established foundation of both sides is connected with the steel materials for stress, the established foundation of both sides is certainly fixed, it can be made to be able to unify, the intensity of the established foundation can be raised, and the intensity of the foundation after restoration can also improve further. Since two or more bearing brackets are provided in the circumference of a massive foundation and a protection engine frame is set up on a bearing bracket, a massive foundation is certainly separable from the foundation by connecting a protection engine frame with a massive foundation certainly, and raising a protection engine frame. And in the moving method of the large-sized torii according to claim 3, since supporting frame is foldable, conveyance of a member and construction of a rise-and-fall transportation means can be performed easily. Since large-sized torii is supported from both sides, inclination is suppressed, it can be stabilized and large-sized torii can be moved.

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem]A moving method of large-sized torii concerning this invention in alignment with said purpose is provided with the following.

A basic construction process which a pillar of both sides is set up on the established foundation which became independent, respectively, and the upper part is how to transfer large-sized torii of a double housing type connected by horizontal bracing, connects said established foundation of both sides, and builds a massive foundation.

Said massive foundation which built a protection engine frame surrounding said large-sized torii, and an engine-frame construction process assembled in one.

A conveying step which raises said protection engine frame by a rise-and-fall transportation means with said large-sized torii and said massive foundation and to which it is made to move.

Wooden things besides a stone-made thing are contained in large-sized torii, for example. As for a massive foundation, it is preferred to say a thing also included the established foundation, and to set and build a level of the established foundation and the upper part. By this composition, it can lay underground in the earth as it is with the established foundation after restoration, and execution time can be shortened, and basic intensity can be raised.

[0005]Since rocking at the time of movement of large-sized torii can be prevented since a protection engine frame is assembled and this protection engine frame is raised, and power raised upwards is not directly added to large-sized torii, damage to large-sized torii can be prevented. It is also possible to connect said established foundation of both sides with steel materials for stress, and to join it with concrete here, to provide two or more bearing brackets which project horizontally substantially around said massive foundation, and to set up said protection engine frame on said two or more bearing brackets. The steel materials for stress refer to steel materials which are used for concrete (henceforth PC) which was able to add prestress, and give tension to an inside of concrete, Steel bars for prestressed concrete which used and made carbon steel, low alloy steel, spring steel, etc. besides a PC wire which performed cold work and bluing to piano wire rods, and hard drawn steel wires for prestressed concrete cold-worked to high carbon steel wire rods to 1 or two or more methods among stretching, a cold drawing, and heat treatment are also contained. What processed it by ****ing to these steel materials is contained. Since the established foundation of both sides is connected with steel materials for stress, the established foundation of both sides is certainly fixed, it can be made to be able to unify and intensity of the established foundation can be raised.

[0006]Two or more foldable supporting frames formed in said rise-and-fall transportation means at both sides of said large-sized torii. It is also possible for it to be provided on a rail constructed on this supporting frame of plurality of both sides, respectively and said rail of both sides, and to provide a movable cart with a rising and falling mechanism and a pendant beam which is constructed over said rising and falling mechanism of both sides, and is connected to said protection engine frame along with this rail. Both sides of large-sized torii mean arbitrary horizontal both sides besides

a longitudinal direction or a cross direction. A cart which attached to the upper part a hydraulic lifter provided with a rod which can project up, for example can be used for a cart with a rising and falling mechanism. Although the number of pendant beams is arbitrary, in order to control rocking of large-sized torii, it is preferred to use two or more. By this composition, since supporting frame is foldable, conveyance of a member and construction of a rise-and-fall transportation means can be performed easily. Since large-sized torii is supported from both sides, inclination is suppressed, it can be stabilized and large-sized torii can be moved.

[0007]

[Embodiment of the Invention] Then, referring to the attached drawing, the embodiment which materialized this invention is described and an understanding of this invention is presented. In drawing 1 - drawing 4, the direction of X explains the right of the large-sized torii 11, and the direction of Y explains the front of large-sized torii, and a Z direction as the upper part. As shown in drawing 1, the moving method of the large-sized torii concerning this invention, For example, it is set up, respectively on the established foundation 13 which the pillars 12 and 12a of both sides became independent of, and 13a. It is the method of transferring the stone-made large-sized torii 11 of a double housing type in which the upper part is connected using the rise-and-fall transportation means 10 with a set-up state by the copings 16 and 17, **** 18 and 19, and ** 20 which constitute a horizontal bracing. First, with reference to drawing 1, the assembly state of the large-sized torii 11 is explained. Height is 5-15m, and a path has the truncated cone shape which becomes small little by little toward the upper part, and the pillars 12 and 12a of the large-sized torii 11 are leaned for a while in the direction which approaches via the turtle stone 15 on the established foundation 13, respectively, and are set up. The copings 16 and 17 and **** 18 and 19 which connect the upper part of the large-sized torii 11 make each end which counters contact, and on **** 18 and 19, after the copings 16 and 17 have appeared, they are polymerized and provided at the crowning of the pillars 12 and 12a.

[0008] The copings 16 and 17 and **** 18 and 19 are symmetrically formed centering on the middle position of the pillars 12 and 12a, and from the pillars 12 and 12a, each outside end is in an outside position, respectively, it is leaned for a while up and formed. When the copings 16 and 17 are contacted in the center section, total length is 10-15m. The lower end of the contact part of **** 18 and 19 is supported by **** 21 of rectangular plate shape, and the lower end of **** 21 is supported by the top center of ** 20 laid across by the pillars 12 and 12a of both sides. The both ends of ** 20 are inserted in the side in which the pillars 12 and 12a counter, respectively, and are being fixed by the wedge member which is not illustrated. The extended member 22 which has ** 20 and an isomorphous section is formed in the both-outside part of each pillar 12 and 12a on extension of the axial center of ** 20.

[0009] Since the copings 16 and 17 and **** 18 and 19 are supported by **** 21 in the mid-position of the pillars 12 and 12a, respectively, if the large-sized torii 11 inclines, it falls out and they may be damaged. Therefore, in order to transfer without disassembling the large-sized torii 11, it is necessary to make it move with a set-up state. Here, the established foundation 13 and 13a which supports the pillars 12 and 12a of the large-sized torii 11 is explained. The established foundation 13 and 13a is independently established with prismatic concrete, respectively. As for the size of each established foundation 13 and 13a, 3-5m, and the depth are 1-3m in 2-4m, and Y shaft orientations at the X axial direction, for example. Since the established foundation 13 and 13a is established independently, respectively, if each relative position changes, bending stress may be added and damaged in the stone-made large-sized torii 11. Since the established foundation 13 and the large-sized torii 11 set up on 13a have the portion which holds the shape by polymerizing and laying each member, a gap of a joint position may produce it by vibration at the time of movement. In order to prevent these, the moving method of the large-sized torii concerning this embodiment has the following processes.

[0010] (Basic construction process) A basic construction process is a process of connecting the

established foundation 13 and 13a of both sides, and building the massive foundation 23. First, as shown in drawing 1 and drawing 2, plane view is carried out between the established foundation 13 and 13a of both sides, and the rectangular basic connection hole 24 is excavated and formed. Subsequently, concrete is slushed into the basic connection hole 24, it is solidified, the established foundation 13 and 13a is connected, and the massive foundation 23 is built. Hereafter, it explains to the massive foundation 23 as a thing also including the established foundation 13 and 13a. Next, the operating hole 26 which surrounds the massive foundation 23 is excavated and formed. As for the depth of the operating hole 26, at this time, it is preferred to form somewhat more shallowly than the depth of the established foundation 13 and 13a somewhat more deeply than the basic connection hole 24. The established foundation 13 and 13a can be connected, holding the supporting strength of the large-sized torii 11 on the established foundation 13 and 13a by this composition, and resistance when raising from the foundation can be made small.

[0011]Subsequently, it forms in the massive foundation 23 by the boring work using the core tube which does not illustrate two or more level holes which carry out plane view and intersect perpendicularly substantially. And the PC bolt 39 using the PC wire which is an example of the steel materials for stress is inserted in each formed level hole, the nut 40 is concluded to the flank of the massive foundation 23, and both ends are fixed to it. By this composition, to the massive foundation 23, compressive force can be given horizontally and the proof stress over the shearing load and bending stress of the massive foundation 23 can be increased. It becomes possible to prevent stress concentration from being added to the large-sized torii 11 without being formed in one and changing the relative position of the pillars 12 and 12a of the both sides of the large-sized torii 11, since especially the established foundation 13 and 13a of both sides is connected with the PC bolt 39 and it is joined with concrete. Next, the position which avoided the fitting location of each PC bolt 39 around the massive foundation 23 is made to project every prescribed interval horizontally substantially, and the bearing bracket 25 is formed in it. The base of the bearing bracket 25 can use a chemical anchor for the circumference of the massive foundation 23, for example, and can be fixed to it. The compression stress to the massive foundation 23 with the PC bolt 39 can be made uniform by attaching a steel plate to the circumference of the massive foundation 23, and attaching the PC bolt 39 and the bearing bracket 25 via a steel plate, and the mounting strength of the bearing bracket 25 can be raised.

[0012](Engine-frame construction process) As shown in drawing 2 - drawing 4, the protection engine frame 27 surrounding the large-sized torii 11 is set up on two or more bearing brackets 25, and is assembled in one with the built massive foundation 23. The lower part of the protection engine frame 27 is connected to the bearing bracket 25 projected and provided in the circumference of the massive foundation 23, and each bearing bracket 25 is connected by the reinforcing member 27a of the frame shape surrounding the massive foundation 23. Thereby, the connection to the massive foundation 23 and the protection engine frame 27 is strengthened. The position of the cross direction of the upper part of the protection engine frame 27 approaches the large-sized torii 11, and is established. As shown in drawing 4, it hangs in the lower part of the protection engine frame 27, and a total of the four supporters 28 is provided. Each hanging supporter 28 can be projected to the cross direction of the established foundation 13 and 13a, respectively, since it is separated from it of the distance between front-and-back-ends parts, when hanging and conveying the large-sized torii 11, is stabilized, can be supported, and it can lessen rocking to the cross direction of the large-sized torii 11. It is preferred to pinch buffer members, such as dunnage which is not illustrated, between the protection engine frame 27 and the large-sized torii 11. By this composition, the vibration at the time of transportation is absorbable, and contact with the protection engine frame 27 and the large-sized torii 11 by rocking can be prevented. As for the wedge member which is fixing the pillars 12 and 12a and ** 20 of the large-sized torii 11, removing is preferred. It is to prevent the large-sized torii 11 from stress being added to a joining section at the time of movement, and being damaged.

[0013](Conveying step) In a conveying step, the rise-and-fall transportation means 10 is built first. Construction of the rise-and-fall transportation means 10 may be begun before a basic construction process, after a basic construction process is completed, it may begin, but it is preferred that the end of an engine-frame construction process and construction of the rise-and-fall transportation means 10 are completed at the same stage. By doing in this way, each work can be done continuously and a construction period can be shortened. As shown in drawing 1 - drawing 5, the rise-and-fall transportation means 10 is provided with the following.

Two or more foldable supporting frames 29 formed on the pedestal 30 which is installed in the both sides of the large-sized torii 11, and is prolonged forward and backward.

The rail 32 constructed two [at a time] via the spacing member 31, respectively on the supporting frame 29 of the plurality of both sides.

The cart 34 with oil hydraulic cylinder 33 which it is provided on the rail 32 of both sides, and is an example of a movable rising and falling mechanism along with the rail 32.

The pendant beam 35 which is constructed over the oil hydraulic cylinder 33 of both sides, and is connected to the protection engine frame 27.

[0014]Since the supporting frame 29 is foldable temporary frame marketed, it can perform conveyance to a fitting location easily. Although the thing of solid frame shape is being used for the spacing member 31, it is also possible to use a plate and a bar depending on the height of the large-sized torii 11. The oil hydraulic cylinder 33 provided in the cart 34 is stroking greatly by raising, for example using the thing of a telescope type box. By this composition, even when the depth of the established foundation 13 and 13a is deep, sufficient margin can be had and raised. As for the oil hydraulic cylinder 33, a total of four sets are used two sets at a time forward and backward, and the pendant beam 35 is attached to the oil hydraulic cylinder 33 used as the pair of the direction both sides of X two [at a time] a total of four. On the pendant beam 35, it can attach to the hanging supporter 28 with which the two hanging support means 36 which have the wire rope which attached the fixing metal 41 to the tip part were established at a time, and were provided in the protection engine frame 27 four places, respectively, and the large-sized torii 11 can be supported. By this composition, since it can support two places at a time the large-sized torii 11 order, respectively, rocking to the direction of X and the direction of Y of [at the time of conveyance] can be lessened, and breakage of the large-sized torii 11 can be prevented.

[0015]When conveying the large-sized torii 11, as shown in drawing 3 - drawing 5, move the cart 34 to the upper front and back position of the large-sized torii 11, and it arranges the pendant beam 35 two [at a time], The fixing metal 41 of the hanging support means 36 attached to the pendant beam 35 is fixed to the corresponding hanging supporter 28 of the protection engine frame 27, respectively. Next, if the cylinder rod of the oil hydraulic cylinder 33 is expanded as shown in drawing 2 and drawing 3, upward power will be added to the protection engine frame 27 via the pendant beam 35 and the hanging support means 36. Since the protection engine frame 27 is connected with the bearing bracket 25 of the massive foundation 23, the massive foundation 23 and the large-sized torii 11 are separated from the foundation, and go up. The weight of the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 is 150-250t, 50-100t and 50-150t, respectively. The level of the center of gravity of the massive foundation 23 and the large-sized torii 11 which were hung, and the protection engine frame 27, Since it is in a downward position from the lower end level of the large-sized torii 11, by supporting the hanging supporter 28 which is in an upper position from the lower end level of the large-sized torii 11, it stops, and it can be stabilized and the inclination and rocking at the time of hanging can be raised.

[0016]Where the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 are raised, the cart 34 can be moved back. As shown in drawing 2 and drawing 4, behind the installed position of the large-sized torii 11, the heavy-lift carrying truck 37 connected two sets is standing by. The cart 34 and the oil hydraulic cylinder 33 can be operated, and the massive

foundation 23, the large-sized torii 11, and the protection engine frame 27 can be loaded via the mounting base 38 on the heavy-lift carrying truck 37. And the heavy-lift carrying truck 37 can be driven and the large-sized torii 11 can be moved further far away. Two or more sets interlock and advance of this heavy-lift carrying truck 37 is attained to arbitrary horizontal directions. After the large-sized torii 11 moves, blinding members, such as a temporary board which does not illustrate the operating hole 26, can close, and other work can be done in a shrine. It is possible to also remove this, when the rise-and-fall transportation means 10 becomes an obstacle.

[0017]In restoring the large-sized torii 11 to the original position, After assembling the rise-and-fall transportation means 10 again and removing a blinding member, the massive foundation 23, the large-sized torii 11, and the protection engine frame 27 are moved with the heavy-lift carrying truck 37, and it hangs again to the hanging support means 36 of the rise-and-fall transportation means 10, and the massive foundation 23 is inserted in the operating hole 26, and is installed. And the large-sized torii 11 can be restored by removing the protection engine frame 27. Although the large-sized torii 11 was supported on the independent established basis 13 and 13a before the move, since this is connected, the massive foundation 23 is built and compression stress is further applied horizontally with the PC bolt 39 and the nut 40, it is stabilized and the large-sized torii 11 can be held certainly for a long period of time. Thus, basic reinforcement can also be performed with transfer work by using the moving method of the large-sized torii concerning this embodiment. As mentioned above, although the embodiment concerning this invention has been described, this invention is not limited to said embodiment, and although the large-sized torii 11 concerning said embodiment has **** 21 and the extended member 22, naturally it is applicable [torii] also to the large-sized torii which omitted this, for example. A structure with an unstable double housing type which has the same shape as large-sized torii is also included in large-sized torii. Also when carrying simultaneously two structures set up on both sides, without changing each relative position, naturally it can apply.

[Translation done.]

* NOTICES *

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a front view showing the execution state of the moving method of the large-sized torii concerning the 1 embodiment of this invention.

[Drawing 2]It is a top view showing the execution state of the moving method of the large-sized torii.

[Drawing 3]It is a front view showing the execution state of the moving method of the large-sized torii.

[Drawing 4]It is a partial side view showing the execution state of the moving method of the large-sized torii.

[Drawing 5]It is a side view showing the execution state of the moving method of the large-sized torii.

[Description of Notations]

A rise-and-fall transportation means, 11:large-sized torii, 12, a 12a:pillar, 13, 13a : 10: The established foundation, A turtle stone, 16, 17:coping (horizontal bracing), 18, 19 : 15: **** (horizontal bracing), ** (horizontal bracing), 21:****, 22:extension member, 23 : 20: A massive foundation, A basic connection hole, 25:bearing bracket, 26:operating hole, 27 : 24: A protection engine frame, A reinforcing member, 28:hanging supporter, 29:supporting frame, 30 : 27a: A pedestal, 31: A spacing member, 32:rail, 33:oil hydraulic cylinder (rising and falling mechanism), 34:cart, 35:pendant beam, 36:hanging support means, 37:heavy-lift carrying truck, 38 : a mounting base, 39 :P C bolt (steel materials for stress), 40:nut, 41: Fixing metal

[Translation done.]

* NOTICES *

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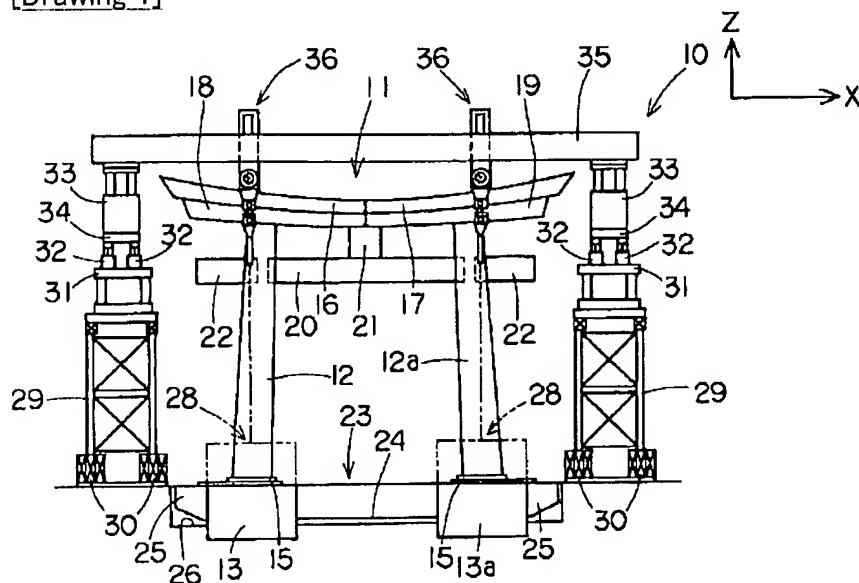
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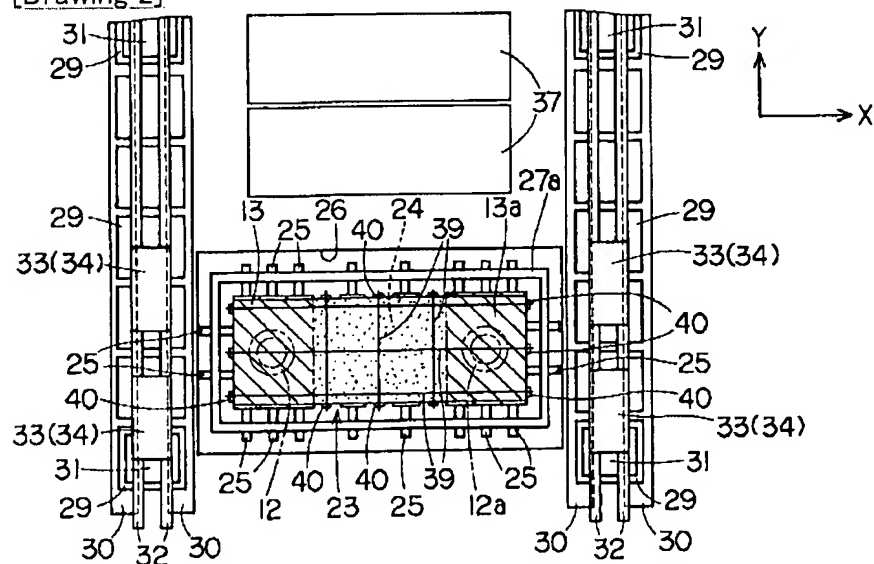
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DRAWINGS

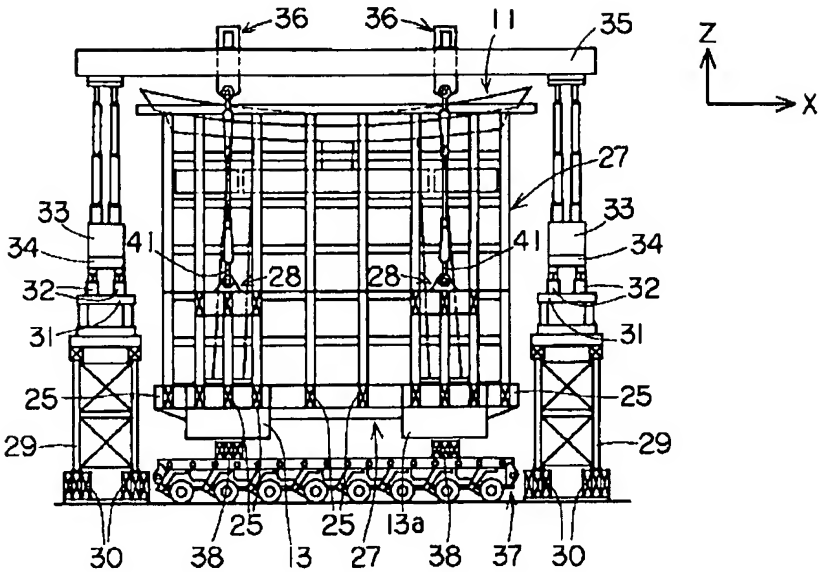
[Drawing 1]



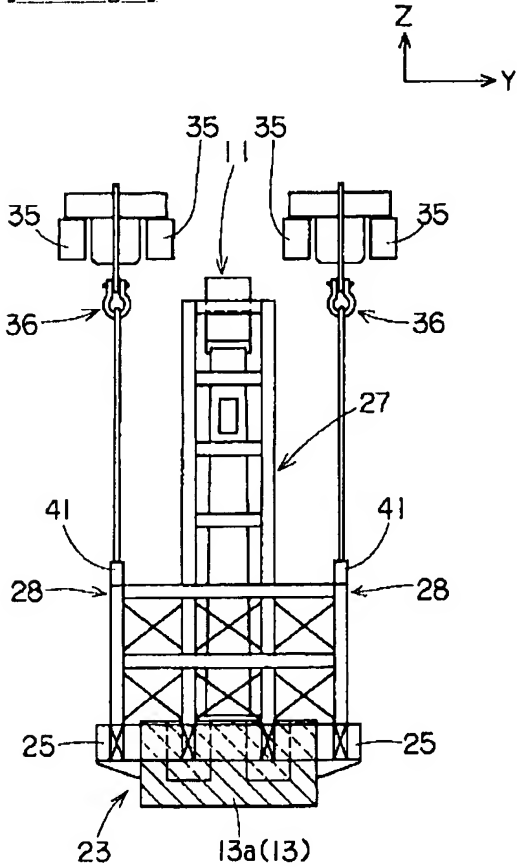
[Drawing 2]



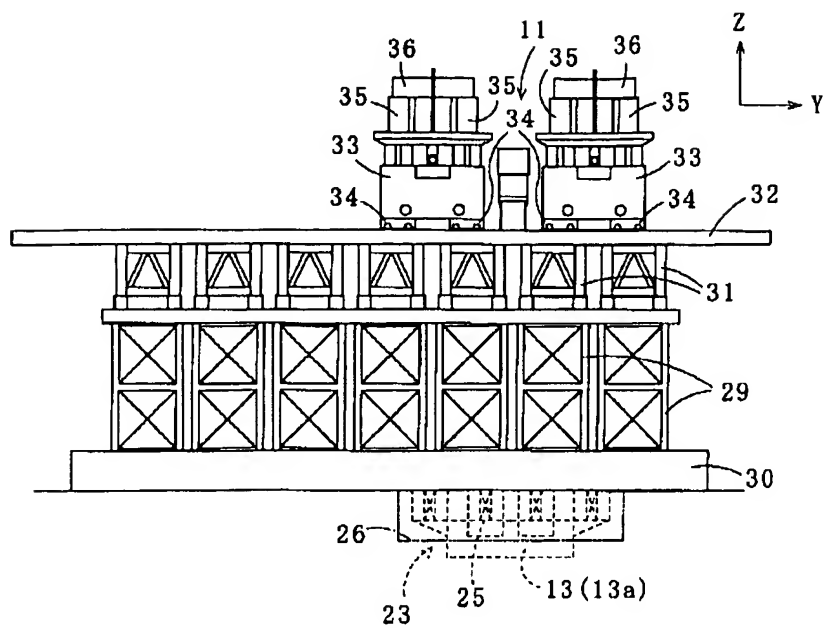
[Drawing 3]



[Drawing 4]



[Drawing 5]



[Translation done.]

BATTERY PACK

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Inventor: ASAI HIDEO

Applicant: MATSUSHITA ELECTRIC IND CO LTD

Classification:

- International: G01R31/36; H01M2/10; G01R31/36; H01M2/10; (IPC1-7): H01M2/10; G01R31/36

- European:

Application number: JP19980183756 19980630

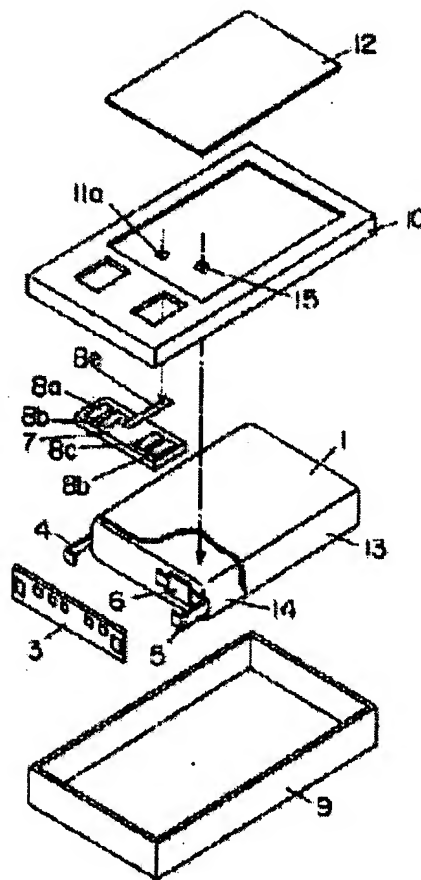
Priority number(s): JP19980183756 19980630

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Abstract of JP2000021372

PROBLEM TO BE SOLVED: To minimally restrain a weight increase and an assembling manhour increase, and to confirm operation of an internal protective circuit board while being still assembled by providing a sheathing case having a through hole in a position opposed to the battery can part of a secondary battery by penetrating inside from the casing surface, and exposing the metallic part of a battery can of the part facing to the through hole.

SOLUTION: The battery can exposing part 14 of not covering a battery can of a secondary battery 1 is arranged in a protective tube 13 covering so as to protect the secondary battery 1, and the battery can becomes a negative electrode of the secondary battery 1. A through hole 15 is arranged in a lower case 10, and the position coincides with the battery can exposing part 14. In a battery pack having such constitution, an inspection terminal 8e can be inspected through a through hole 11a, and the battery can exposing part 14 (that is, a battery negative electrode) can be inspected through the through hole 15. Since there is no need to particularly arrange a terminal in the inspection terminal of the battery negative electrode, a weight increase and an assembling manhour increase of the battery pack can be restrained. After inspecting a protective circuit board 3, a nameplate is stuck to hide the through holes 11a, 15.



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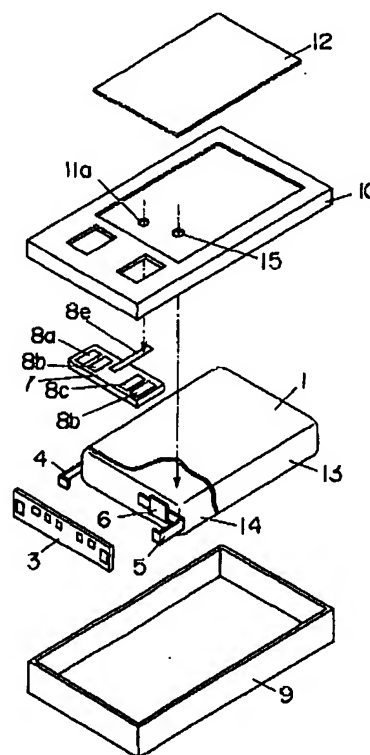
5H020 AS06 DD13 DD20 MM19 MM31

(54)【発明の名称】 電池パック

(57)【要約】

【課題】 二次電池、およびその充放電状態を制御する保護回路基板を収納した電池パックにおいて、組み立て終了後における保護回路基板の動作確認のみに使用される検出端子は、重量増加や組み立て作業の工数増加を招いてしまい、電池パックの小型化、軽量化を妨げてしまう。

【解決手段】 発電要素を収容し、正負極いずれか一方の端子を兼ねる金属製の電池缶を被覆部材によって被覆した充放電可能な二次電池、保護回路基板を、外装ケースに収納した電池パックであって、外装ケースは筐体表面から内部に貫通し、二次電池の電池缶部分に対向する位置に透孔を有し、二次電池の透孔を臨む部位において電池缶の金属部分が露出している構成とし、透孔を通して検出用素子を電池と接続することで検出用端子を不要とする。



【特許請求の範囲】

【請求項1】発電要素を収容し、正負極いずれか一方の端子を兼ねる金属製の電池缶を被覆部材によって被覆した充放電可能な二次電池、保護回路基板を、外装ケースに収納した電池パックであって、

該外装ケースは筐体表面から内部に貫通し、該二次電池の電池缶部分に対向する位置に透孔を有し、該二次電池の該透孔を臨む部位において電池缶の金属部分が露出していることを特徴とする電池パック。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、充放電可能な二次電池および該電池の充放電状態を制御する保護回路基板を筐体内に収容した電池パックに関するものである。

【0002】

【従来の技術】近年、携帯通信機器あるいは小型パーソナルコンピュータに代表される小型携帯機器の多機能化に伴って消費電力が増加しており、これら機器の駆動電源となる電池パックに対して機器の駆動時間を確保するために高エネルギー化が求められている。このため、電池パックに対する安全性を確保するために、電池パックの筐体内部に収容される二次電池の充放電状態の制御には、より複雑な技術が要求されている。例えば、実開平4-101373号公報に記載されるように、電池パック内部には充放電状態を制御する回路素子およびPTC等の保護素子等が収容されている。

【0003】特に最近では、携帯機器の小型、軽量化が強く求められており、電池パックの筐体を小型化するため必要がある。このため、電池パックの内部空間に占める回路基板部分の割合を減少させる必要があり、保護回路基板上に回路素子をリフローによって実装する構成が採用されている。

【0004】このような構成を採用した電池パックでは、保護回路基板に実装される素子がリフロー時に高温に曝されることになり、電池パックを完成後に、筐体内部に収容された回路基板が、過放電や過充電等に対して正常な動作することを確認する必要がある。動作の確認には、保護回路が機能する状況とする必要が生じるが、この方策では二次電池に対して悪影響を与えてしまう。そこで、動作確認用の検査端子を設け、これを筐体表面に露出させる構成が採用されている。さらに検査終了後には、通常の使用に対し、この端子は不要となるため、注意書き等が記載された銘板にて検査端子を覆い隠す構成とされている。

【0005】以下、検査端子を有する公知の電池パックの構成について、図面を参照して説明する。図2において、1は二次電池、2は二次電池1を被覆することで二次電池を保護するための保護チューブ、3は保護回路基板であり、回路には少なくとも充放電状態を制御するICが実装される。また、4および5は二次電池と保護

回路基板3とを接続するリード板であり保護回路基板3とは半田付けされる、6は保護素子である。7は電池パックと本体機器とを電気的に接続する端子であり、保護回路基板3と半田付けされる。8a~8fは端子7に設けられた金属性の接点であり、8a~8dは本体機器の端子と接触する接点、8e、8fは保護回路基板3の機能を検査するための検査端子として働く。8e、8fは通常保護回路基板3上のICの機能を検査する端子と、二次電池の負極の電位を検出する端子である場合が多い。9は上ケース、10は下ケースであり、上ケース9と下ケース10内に二次電池、保護回路基板3、リード板4、5、保護素子6、端子7とを収納後上ケース9と下ケース10は接着される。

【0006】11a、11bは上ケース10に設けられた透孔であり、上ケース9と下ケース10が接着されたあとでも、透孔11a、11bを通じて保護回路基板3の機能を検査することが可能となっている。また12は下ケース10上に、透孔10a、10bを隠蔽するように貼り付けられる銘板である。

【0007】

【発明が解決しようとする課題】上記構成を有する電池パックでは、保護回路基板を検査するための検査端子をケースの銘板貼り付け部の直下に位置させる必要がある。通常、保護回路基板が下ケースの直下に位置しない場合は、本来の電池パックの機能としては不必要な検査用端子を別途設ける必要があり、そのため電池パックの重量が増すだけでなく、半田付け等の作業が増えるため工程内での誤作業の可能性も増えるという課題を有していた。

【0008】本発明はこの課題を解決するもので、電池パックの重量増加や組み立て作業の工数増加を最小限に押さえて、最終組み立て終了後に電池パックを解体することなしに内部の保護回路基板の動作確認を行うことができることを目的とする。

【0009】

【課題を解決するための手段】前記目的を達成するために本発明の電池パックは、発電要素を収容し、正負極いずれか一方の端子を兼ねる金属製の電池缶を被覆部材によって被覆した充放電可能な二次電池、保護回路基板を、外装ケースに収納したものであり、さらに外装ケースは筐体表面から内部に貫通し、二次電池の電池缶部分に対向する位置に透孔を有し、二次電池の透孔を臨む部位において電池缶の金属部分が露出している構成を採用したものである。

【0010】

【発明の実施の形態】以下、本発明の実施形態について説明する。

【0011】本発明の請求項1に記載の発明は、金属製の電池缶を被覆部材によって被覆した充放電可能な二次電池、保護回路基板を、筐体表面から内部へ貫通する透

孔を有する外装ケースに内蔵した電池パックであり、二次電池と透孔とを対向させて配置し、電池缶の透孔を臨む部位において金属部分が露出した構成を採用したものである。

【0012】この構成によれば、電池パックの重量増加や組み立て作業の工数増加を最小限に押さえて電池パックを解体することなしに内部の保護回路基板の動作確認を行うことができるという作用を有する。

【0013】また、透孔より検査用の測定端子を挿入し、保護回路基板を検査した後に前記透孔の上に銘板を貼り付けて透孔を隠蔽することによって、電池パック製造時の最終段階で保護回路基板の動作状態を確認することができる。

【0014】図1は本発明の電池パックを示すものであり、図1において、図2における構成と同等の機能を有する部分、すなわち図1における1から12については、同一の番号を付しており、その詳細な説明は省略するものとし、本実施の形態では新たな番号を付した部分のみの説明とする。図1において、13は二次電池に被せられた二次電池を保護するための保護チューブであり、二次電池の電池缶を覆わない部分14を一部設けており、二次電池の電池缶は二次電池の負極となっている。15は下ケース10に設けられた透孔であり、その位置は電池缶露出部14と一致している。

【0015】以上のような構成の電池パックでは、透孔11aを通じて検査端子8eを、また透孔15を通じて

電池缶露出部14（すなわち電池負極）を検査することが可能であり、電池負極の検査端子については特別に端子を設ける必要もないため電池パックの重量増加や、組立工数の増加を押さえることができる。

【0016】検査後は銘板12を下ケース10に貼り付ければ電池パックとして完成する。なお、本実施例では二次電池は角型の電池を用いたが、円筒型の電池を用いても本実施例の効果をを得ることができる。

【0017】

【発明の効果】以上のように本発明によれば、電池パックの重量増加や組み立て作業の工数増加を最小限に押さえて電池パックを最終組み立て終了後に解体することなしに内部の保護回路基板の動作確認を行うことができるという有利な効果が得られる。

【図面の簡単な説明】

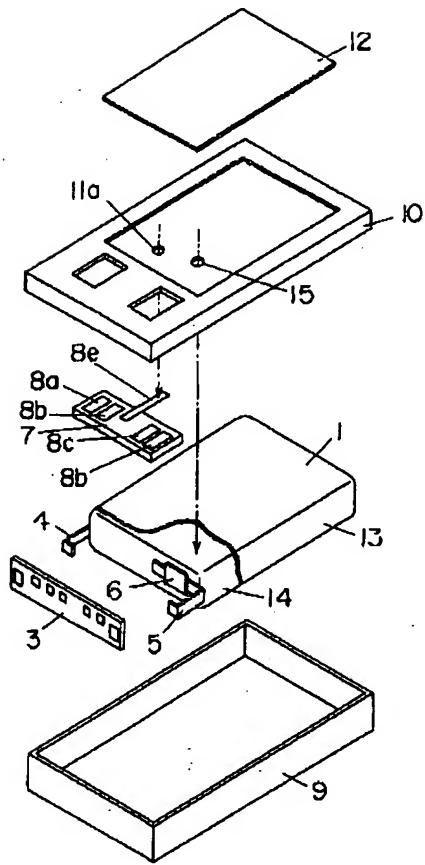
【図1】本発明の電池パックの構成を示す分解斜視図

【図2】従来の電池パックの構成を示す分解斜視図

【符号の説明】

- 1 二次電池
- 3 保護回路基板
- 7 端子
- 5 半田ランド
- 9 上ケース
- 10 下ケース
- 12 銘板
- 15 透孔

【図1】



【図2】

